

## **In the Specification:**

Please make the following changes in the specification at the locations indicated by page and line number:

Page 2, lines 3 to 7, please make the following changes in the paragraph between these lines:

The present invention relates to a control unit for mixed light illumination, especially for control of LED lighting devices of a microscope, stereomicroscope, macroscope and industrial image processing and/or vision machine. For simplicity in the following the term "microscope" is used in some cases for the foregoing devices in the ~~both specification and claims appended below~~.

Page 2, lines 11 to 18, please make the following changes in the paragraph between these lines:

The optimum illumination of objects to be examined plays an important role in microscopy. Whether accurate images or shapes are to be detected by an observer or automatic image analysis system generally depends on the illumination. Stereomicroscopy puts especially high requirements on the quality of the illumination. In that area exactly point-wise production of light ~~exactly point-wise~~ and shadow often occurs. The more accurately the incident light falling on the object is controlled, the more information can be obtained by microscopic examination of the object.

Page 3, lines 4 to 18, please make the following changes in the paragraph between these lines:

Fiber optic and LED illumination systems are established as illumination sources. Fiber optic illumination systems generally include cold light sources and various light guides connected to a light source. Different types of light guides are known to provide the above-described types of illumination. DE 198 20 012 C1 describes a fiber-optic transmitted light device for producing bright field illumination in transmitted light. This device has a cold light source connected to a light distributing body formed as a hollow chamber by means of a light guide. The input end of the light guide is connected to the cold light source and the output end to the light distributing body. Further examples ~~example~~ of fiber optic illumination systems include split- or multipoint ring guides for producing a shadow-free bright field illumination in incident light, dark field ~~field~~-ring guides for producing a shadow-free dark field illumination in incident light, multi-armed point light guides for producing inclined incident light with a predetermined adjustable incidence direction and linear guides for lateral bordering incident light dark field illumination with inclined shadows.

Page 4, lines 4 to 22, please make the following changes in the paragraphs between these lines:

The ~~Often the~~ long service life of the LEDs in comparison to the halogen reflector lamps generally used for the cold light source is ~~given or stated as an~~

~~often stated advantage of the LED illumination systems system in contrast to the fiber optic illumination systems system. However reduced~~ Reduced-brightness and less compact structure for the LED illumination heads are substantial disadvantages for the LED illumination systems in contrast to the fiber optic illumination systems.

[[A]] The simpler electronic control of the LEDs is a decisive advantage of the LED illumination systems system over the fiber optic illumination systems system however is the simpler electronic controllability of the LEDs. Use Meanwhile use of LED illumination for microscopic applications is increasing because of this advantage. U.S. Patent 5,690,417 described an LED ring guide, with which individual LED groups can be controlled, e.g. arranged as circular or ring light segments. The incidence direction of the light in inclined incident light may be changed by control of these segments. Suitable control of the ring light segments in a predetermined sequence can produce the impression of a light rotating around the object. This type of moving illumination can help to obtain a better impression of the three dimensional shape of the object. Fiber optic illumination systems can control individual segments of lighting units be ~~controlled segmented~~ only with considerable mechanical effort and expense. Segment ~~The segment-control~~ has not been commonly used for fiber optic systems for this reason.

Page 9, lines 13 to 21, please make the following changes in the paragraph between these lines:

Furthermore ~~the interval control~~ in an especially advantageous manner interval control allows moving light sources and/or lighting units with mixed light characteristics to be simulated in a special manner by sequential control of partial regions or parts of one and/or several lighting units. Thus various changing light and shadow images are produced. If ~~for example~~ an LED ring light is used as lighting unit, an impression of a rotating light source arises by sequential control of adjacent ring segments. When more than one lighting unit is used, synchronously ~~synchronous~~ or oppositely rotating ~~rotation~~ light sources and/or other arbitrarily moving patterns or combinations can be produced.

Page 11, lines 1 to 11, please make the following changes in the “Brief Description of the Drawing” section:

### **BRIEF DESCRIPTION OF THE DRAWING**

The objects, features and advantages of the invention will now be described in more detail with the aid of the following description of the preferred embodiments, with reference to the following figures, in which

Figure 1 is a diagrammatic plan view of the control unit according to the invention with connected lighting units, operating elements and a computer interface; and

Figure 2 is a plan ~~front-view~~ of an LED incident light brightness field ring light acting as a lighting unit in the apparatus shown in Fig. 1.

Page 11, lines 15 to 23, please make the following changes in the paragraph between these lines:

The control unit 1 shown in figure 1 has ~~available~~ an interface 2 for connection to an external network-connection-2, flash synchronization means 3 for connection to ~~an interface 3~~ for an external image-taking unit, a foot switch 4 for retrieval and switching between different user settings or commands and an interface 5 for connection with an external computer. An LED incident light brightness field ring light 6, an LED incident light dark field ring light 8 and an LED transmitted light 7 are connected to the control unit 1 and act as the lighting units of the invention, which are controlled by the control unit 1. The plan view of the front surface of ring light [[8]]\_6 shown in fig. 2 shows the circular arrangement of the individual LEDs 9.

Page 13, lines 1 to 13, please make the following changes in the paragraph between these lines:

The data sheets provided by the LED manufacturer describe the combinations of the operating current strength values and threshold and/or maximum temperature values for the LEDs that are used. The control unit 1 has an integrated microprocessor, which determines the respective threshold and/or maximum temperature based on a comparison table with the aid of a suitable algorithm. When the threshold and/or maximum temperature is reached, the user can dim or better cool the concerned lighting unit. If a maximum temperature is exceeded, which in the embodiment shown is 5°C above the threshold

temperature, the control unit 1 is automatically switched off and is put into operation again when [[a]] sufficient cooling has taken place. Alternatively the control unit 1 can also automatically dim the concerned lighting unit. The maximum temperature is set ~~thus designed~~ so that the maximum allowed LED temperatures specified in the LED data sheets from the manufacturer are not reached ~~achieved~~.